AMENDMENTS TO THE CLAIMS

In claim 1(b), please insert the word "uniform" before the first occurrence of "blocks," so that the amended claim will read in entirety: "subdividing the current video frame into uniform blocks of a selected block size, and comparing the blocks to corresponding blocks of a decoded version of a preceding video frame to determine whether any of the blocks of the current video frame are sufficiently unchanged from the preceding frame to be discarded;".

In claim 1(d), please insert the word "frame" before "compression", and the word "uniform" before "block size", so that the amended claim 1(d) shall read in entirety: "selecting from the multiple block sizes a uniform block size that produces a best video frame compression result; and".

In claim 3, please insert the word "uniform" before "block sizes".

In claim 7, please append "from frame to frame" at the end of the sentence, so that claim 7 shall read in its entirety: "The method as in Claim 4, wherein the preamble block size varies from frame to frame."

In claim 20(a), please replace "blocks of a selected block size" with "uniform blocks of a selected size", so that claim 20(a) shall read in its entirety: "subdividing a current video frame into uniform blocks of a selected ~~block~~ size;".

ARGUMENTS TO THE REJECTED CLAIMS

We respectfully request reconsideration of all claims rejected in the Office Action of August 11, 2004.

Claims 1-24 were pending in this application (hereafter "Meggers"). The Office Action rejected all claims. Specifically, claims 1-9, 13-15 and 19-24 were rejected as anticipated by Krause. Claims 10-12 and 16-17 were rejected as unpatentable over Krause (US Patent 5,235,419). Claim 18 was rejected as unpatentable over Aharoni (US Patent 6,014,694) in view of Krause.

We assert there has been a misunderstanding by the Examiner: Krause and Meggers are essentially unrelated to each other, and thus Krause cannot anticipate Meggers nor render it unpatentable. The claims have been clarified (see above) to make the intent more clear. We also argue anticipation and patentability, first for all claims collectively, then for each claim rejection individually.

GENERAL ARGUMENT

Briefly, Meggers is a block-based video frame encoding algorithm, while Krause is not; Krause is a motion compensation encoding algorithm, while Meggers is not. Meggers' algorithm is part of the general class of block-based difference encoding algorithms, while Krause is designed to support the entirely different general class of motion-compensated difference encoding algorithms. See the attached exhibit, "Interframe Compression Techniques" by Colin Manning, lecturer in computer science at the Cork Institute of Technology, for a concise explanation of the difference between the two.

Krause details the calculation of block sizes for motion compensation in order to reduce the usage and the amount of encoding of motion vectors. Motion vectors, motion compensation and motion estimation are not mentioned, used in, or required for Meggers.

Meggers, by contrast, addresses the actual encoding of entire video frames, optimized by the selection of an optimal uniform encoding block size for each individual frame. Meggers has invented an efficient way to find the optimal uniform block size for a single frame. Whole-frame encoding is not mentioned, used in, required for, or anticipated by Krause. Krause also does not disclose or claim any specific method of bitmap data compression. Krause merely addresses a way to use different sizes of motion compensated blocks that reference different size block areas in a past video frame.

Krause states in the first paragraph of his "DETAILED DESCRIPTION OF THE INVENTION:" "A large block size will work well in regions where the image is still or translating uniformly. In such cases, a large block size is preferred to a small block size, since there is less overhead required to transmit the motion vectors associated with each of the image blocks." Krause is explicitly stating that his "adaptive block size" invention is used only for the area of motion compensation. No disclosure or claim is made by Krause regarding the actual encoding of frames or blocks.

Because neither Krause nor Meggers substantively mentions nor references the subject discussed by the other, we argue that Krause does not and cannot anticipate Meggers, and claims 1-9, 13-15 and 19-24 should be reconsidered.

Meggers' encoding algorithm makes a non-obvious, in fact fundamentally counterintuitive, tradeoff between compression ratio, bandwidth, and decompression speed: it

employs a deliberately *inferior* compression scheme to achieve *superior* frame rate performance on low-performance digital viewing devices such as PDAs and cellular phones. It would be impossible to use any algorithm similar to Krause on such devices, because of insufficient computing power.

Meggers' method results in inferior performance on nearly all computing devices except PDAs, and thus would not logically have been anticipated by Krause. Meggers' discovery is that, under the unusual landscape of technical contraints on PDAs (the ratios of screen size to bandwidth, MIPS to bandwidth, and RAM to bandwidth are all much lower than on all other types of computing devices) certain algorithms result in unexpectedly optimal performance on these particular platforms: namely battery-powered handheld devices with displays smaller than 300x300 pixels and CPU performance below 20 MIPS.

Krause's claims all revolve around the division of individual video frames into blocks of variable size, and the decision rules for such division. This is logical for faster computers with large displays, such as televisions or PCs, but is inefficient on PDAs and smart phones because (i) it requires too much processing power, (ii) the dictionary of received preamble data requires too much memory, and (iii) the PDA display is not large enough to justify the incremental benefit of variable block size. By contrast, Meggers' breakthrough is to apply block size decision rules on a frame-by-frame, rather than block-by-block, basis. This is a non-obvious tradeoff, because it provides an inferior compression ratio, yet higher frame rate on devices with very little computing power, than does Krause.

Krause writes, "The decision on which block size to use is made on a block-by-block basis." (column 6 line 57-58.) Krause never discusses nor suggests any other basis for applying

decision rules. By contrast, Meggers makes a **frame-uniform** block size decision, which then varies on a frame by frame basis. Meggers' approach results in slower performance on the fast, large-display computers anticipated by Krause, such as desktop PCs. For this reason, Meggers' approach is not anticipated by Krause. By contrast, Meggers' approach results in faster performance on very low-performance, small-display, low-memory devices such as PalmOS and smart phones.

Because of the inapplicability of Krause to Meggers, and because of the lack of overlap between the subject of motion compensation discussed by Krause, versus the subject of block-based difference encoding discussed by Meggers, we conclude Meggers does not and cannot follow logically from Krause. Thus Meggers cannot be rendered unpatentable by Krause, and all claims should be reconsidered.

ARGUMENTS TO EACH REJECTED CLAIM

Meggers' claim 1 was rejected in the Examiner's response item 3, page 3, line 3, as anticipated by Krause's "DETAILED DESCRIPTION OF THE INVENTION", columns 5 through 7. Contrary to the Examiner's assertion, Meggers' claim 1(e) states "**encoding the video frame** in the video stream with the block size selected in (d)." Contrary to the Examiner's assertion, block-based difference encoding is not disclosed in Krause column 8 lines 6-30, nor anywhere else in Krause, and thus is not anticipated by Krause. Krause discloses solely in the area of motion vector compression, which relates only to a specific type of video compression that, while common to broadcast video compression, is not a subject of Meggers. Similarly, Meggers' claims 1(b), (c) and (d) all pertain to the efficient selection of a single, optimal uniform block size producing the smallest amount of data for an actual, block-based difference-encoded

frame. Krause does not discuss block-based difference encoding, nor the use of a single best-fit block size for an entire frame. As a result of the dissimilarity, we assert claim 1 is not anticipated by Krause, and should therefore be allowed.

Meggers' claim 2 was rejected in the examiner's response item 3, page 3, line 4: "Regarding claim 2, Krause discloses that the method for repeating (a), (b), (c), (d), and (e) for each of multiple frames of the video stream to generate an encoded video stream in which different frames are encoded using different block sizes (Krause: column 5, lines 23-45)." We assert this is an incorrect reading of Krause. The identified section of Krause in fact never mentions frame encoding, nor block-based difference encoding, nor the use of a uniform block size (per frame) that varies with each ensuing frame, as contemplated by Meggers. More generally, these ideas are not mentioned anywhere else in Krause. Krause pertains only to decision rules in determining the size of blocks (varying from block to block, not frame to frame as in Meggers) for optimal data reduction in motion compensation and estimation (not block-based difference encoding, a in Meggers). Therefore, we assert claim 2 is not anticipated by Krause and should therefore be allowed.

Meggers' claim 3 was rejected in the Examiner's response item 3, page 3, lines 8-17 as anticipated by Krause columns 6-7. Contrary to the Examiner's assertion, we note that Krause columns 6 and 7 never mention video frame encoding, nor the storing of an entire video frame, nor block-based difference encoding (which is the subject of Meggers). Again, Krause relates to block size evaluation solely for purposes of motion compensation, not block-based whole-frame encoding. Meggers does not claim to have invented block-based encoding in general, but rather to have invented a novel means of selecting an optimal uniform block size that varies frame by frame, permitting reasonable video quality with rapid decoding on low-performance devices.

Nothing of the sort is disclosed in Krause, even tangentially, because Krause is solves a fundamentally different problem by employing motion compensation. Therefore, we assert claim 3 is not anticipated by Krause, and should therefore be allowed.

Meggers' claim 4 was rejected in the Examiner's response item 4, page 3, lines 18-23 as anticipated by Krause columns 5-7. Contrary to the Examiner's assertion, Krause makes no disclosure nor claim regarding (i) encoding a block-based difference-encoded frame, (ii) choosing an optimum uniform block size for use across an entire frame, (iii) using a uniform block size in actual encoding, or (iv) varying a uniform block size from frame to frame. Instead, the thrust of Krause is to identify blocks of variable size for use in motion compensation. There's no reasonable way to get to Meggers from there. Contrary to the Examiner's assertion, column 6 lines 37-58 do not make any proprietary claim over any video frame encoding algorithm, as Meggers does. In fact, Krause expressly states in section 6, line 40-43 that "The resulting difference signal is compressed in conventional compression circuitry which can use, for example, the DCT compression algorithm." In other words, Krause expressly states he is making no disclosures or claims about specific frame data encoding methods. In short, Krause has no bearing on Meggers. Therefore we assert claim 4 is not anticipated by Krause, and should therefore be allowed.

Meggers' claim 5 was rejected in the Examiner's response item 4, page 4, lines 1-3 as anticipated by Krause column 8, lines 50-65. Contrary to the Examiner's assertion, Krause states in that section, "The motion vector data, which may or may not be compressed, contains all of the information needed to reproduce the motion compensation process at the decoder." Krause does not discuss frame-by-frame encoding or compression, which are the basis of the Meggers claim. Therefore we assert claim 5 is not anticipated by Krause and should therefore be allowed.

Meggers' claim 6 was rejected in the Examiner's response item 4, page 4, lines 4-5. Contrary to the Examiner's assertion, Krause pertains not to video frame encoding, but to the encoding of motion vectors. Meggers presents an algorithm for optimizing the compression of whole frames for decompression on low-performance devices. Since Krause makes no description nor claim of any whole-frame encoding algorithm, we assert claim 6 is not anticipated by Krause and should therefore be allowed.

Meggers' claim 7 was rejected in the Examiner's response item 4, page 4, lines 6-7. Meggers claim 7 (as clarified in the Amendment above) pertains to the variance of preamble data, for encoded whole frames, from frame to frame. Since Krause does not disclose anything regarding block-based difference encoding, nor whole-frame encoding, nor preamble data, nor the frame-by-frame selection of optimal frame-uniform block size, Krause cannot be considered to anticipate Meggers. Therefore we assert claim 7 is not anticipated by Krause and should therefore be allowed.

Meggers' claims 8-9 were rejected in the Examiner's response item 4, page 4, lines 8-10. Meggers here claims the novelty of comparing the difference between the luminance component of two different encode video frames to a pre-defined or user-defined threshold level. The word "luminance" does not appear anywhere in Krause, and is never alluded to by Krause. Therefore we assert claims 8 and 9 are not anticipated by Krause and should therefore be allowed.

Meggers' claim 13 was rejected in the Examiner's response item 4, page 4, lines 11-17, on the basis that the claimed method of encoding video is anticipated by Krause columns 5-7. Contrary to the Examiner's assertion, Krause does not in fact disclose anything related to encoding whole frames of video. Krause's disclosures relate solely to the encoding of motion

vectors, which are directional vectors used to communicate the amount and direction of translation for components of an image display in a motion compensation video encoding system. Meggers' claim is an improvement to uniform block size determination for block-based video encoding, and has nothing to do with motion vectors. Therefore we assert claim 13 is not anticipated by Krause and should therefore be allowed.

Meggers' claim 14 was rejected in the Examiner's response item 4, page 4, lines 18-22, on the basis that the claimed method, which encodes bitmaps into preamble blocks, is anticipated by Krause. Contrary to the Examiner's assertion, Krause expressly states in section 6, line 40-43 that "The resulting difference signal is compressed in conventional compression circuitry which can use, for example, the DCT compression algorithm." In other words, Krause expressly states he is making no disclosures about frame data encoding or compression. By contrast, Meggers claims novelty in precisely that area. Therefore, we assert claim 14 is not anticipated by Krause and should therefore be allowed.

Meggers' claim 15 was rejected in the Examiner's response item 4, page 5, lines 1-8, on the basis that whole-frame video encoding was anticipated by Krause. In the claim, Meggers states "receiving the encoded video frame encoded using multiple block size detection method". This is not anticipated by Krause, because Krause makes no disclosure nor claim regarding block-based difference encoding, nor compression of whole frames. Therefore, we assert claim 15 is not anticipated by Krause, and should therefore be allowed.

Meggers' claim 19 was rejected in the Examiner's response item 4, page 5, lines 9-15, on the basis that Krause has anticipated a system which identifies and selects the smallest encoded whole frame. In fact, Krause does not address uniform-block whole-frame encoding at all.

Krause deals solely with finding the optimum set of varying-size blocks of moving image components, so that motion vectors can be transmitted and then decoded by the client. Meggers deals solely with finding the optimum set of uniform-size blocks of data in an image, by selecting from a set of trial results of various uniform block sizes. Therefore we assert claim 19 is not anticipated by Krause, and should therefore be allowed.

Meggers' claim 20 was rejected in the Examiner's response item 4, page 5, line 16 through page 6, line 2, on the basis that it was anticipated by Krause. Contrary to the Examiner's assertion, Krause does not divide frames into blocks of a uniform size; rather, he subdivides images into blocks of varying size, so that smoothly translating image components can be extracted for the purpose of motion vector encoding. Krause never mentions frame-uniform block encoding, and therefore we assert claim 20 is not anticipated by Krause, and should therefore be allowed.

Meggers' claims 21-23 were rejected in the Examiner's response item 4, page 6, lines 3-4 as anticipated by Krause column 8, lines 5-30. We argue there are at least two reasons these claims were not anticipated by Krause. First, Meggers is discussing block-based difference encoding of entire frames, while Krause is discussing the wholly different matter of block-based motion vector encoding. Second, Krause only discusses varying block size within a frame, while Meggers only discusses varying block size between frames. Krause (column 6, lines 57-58) specifically states "The decision on which block size to use is made on a block-by-block basis." Since Krause never presents any block-based difference encoding solution, nor any block size selection algorithm designed to be uniform within a frame but to vary frame by frame, we argue that Krause does not anticipate Meggers' claims 21-23, and thus they should be allowed.

Meggers' claim 24 was rejected by the Examiner's response item 4, page 6, lines 5-15. Contrary to the Examiner's assertion, Meggers' claim, which varies a selected optimum uniform block size with each ensuing frame for the purpose of block-based difference encoding, is fundamentally different from Krause, which selects varying block sizes in a single frame for the purpose of block-based motion vector encoding.

Meggers' claims 10-12 and 16-17 were rejected by the Examiner's response items 5 and 6, pages 6 through 8, on the basis that they were unpatentable over Krause in view of Cooper (in the case of claims 10-12) and Aharoni (in the case of claims 16-17). Contrary to the Examiner's assertion, Krause makes no disclosure nor claim regarding (i) algorithms for block-based encoding or decoding of entire video frames; (ii) selecting optimal **uniform** block size within a frame; (iii) varying an optimum uniform block size from frame to frame; nor (iv) any block-based difference encoding algorithm. These four items are all fundamental components of Meggers. None could reasonably be derived from Krause by one skilled in the art, because the Krause invention is aimed at a wholly different scheme for video data reduction, namely motion compensation. Thus the claims cannot be considered unpatentable over Krause, and therefore we request that claims 10-12 and 16-17 be allowed.

Meggers' claim 18 was rejected by the Examiner's response item 7, page 8-9, as unpatentable over Aharoni in view of Krause. Contrary to the Examiner's assertion, Krause makes no disclosure or claim regarding (i) algorithms for block-based encoding or decoding of entire video frames; (ii) selecting optimal **uniform** block size within a frame; (iii) varying an optimum uniform block size from frame to frame; nor (iv) any block-based difference encoding algorithm. These four items are all fundamental components of Meggers. None could reasonably be derived from Krause by one skilled in the art, because the Krause invention is

aimed at a wholly different scheme for video data reduction, namely motion compensation. Thus the claims cannot be considered unpatentable over Aharoni in view of Krause, and therefore we request that claim 18 be allowed.

CONCLUSION

In view of the foregoing, Applicant believes all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

Respectfully submitted,

Jens Meggers
(Named Inventor)